What You Can't Smell Might Hurt You !!

The DOE National Workshop on State Energy Codes

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Don Stevens

- Stevens and Associates
- Keyport, WA
- dstevens@telebyte.com
- Vice Chair, Home Ventilating Institute
- Voting Member, IRC Mechanical and Plumbing Committee
- Voting Member, ASHRAE 62.2 Committee

Ventilation Strategies

- Supply Ventilation
- Exhaust Ventilation
- “Balanced” Ventilation

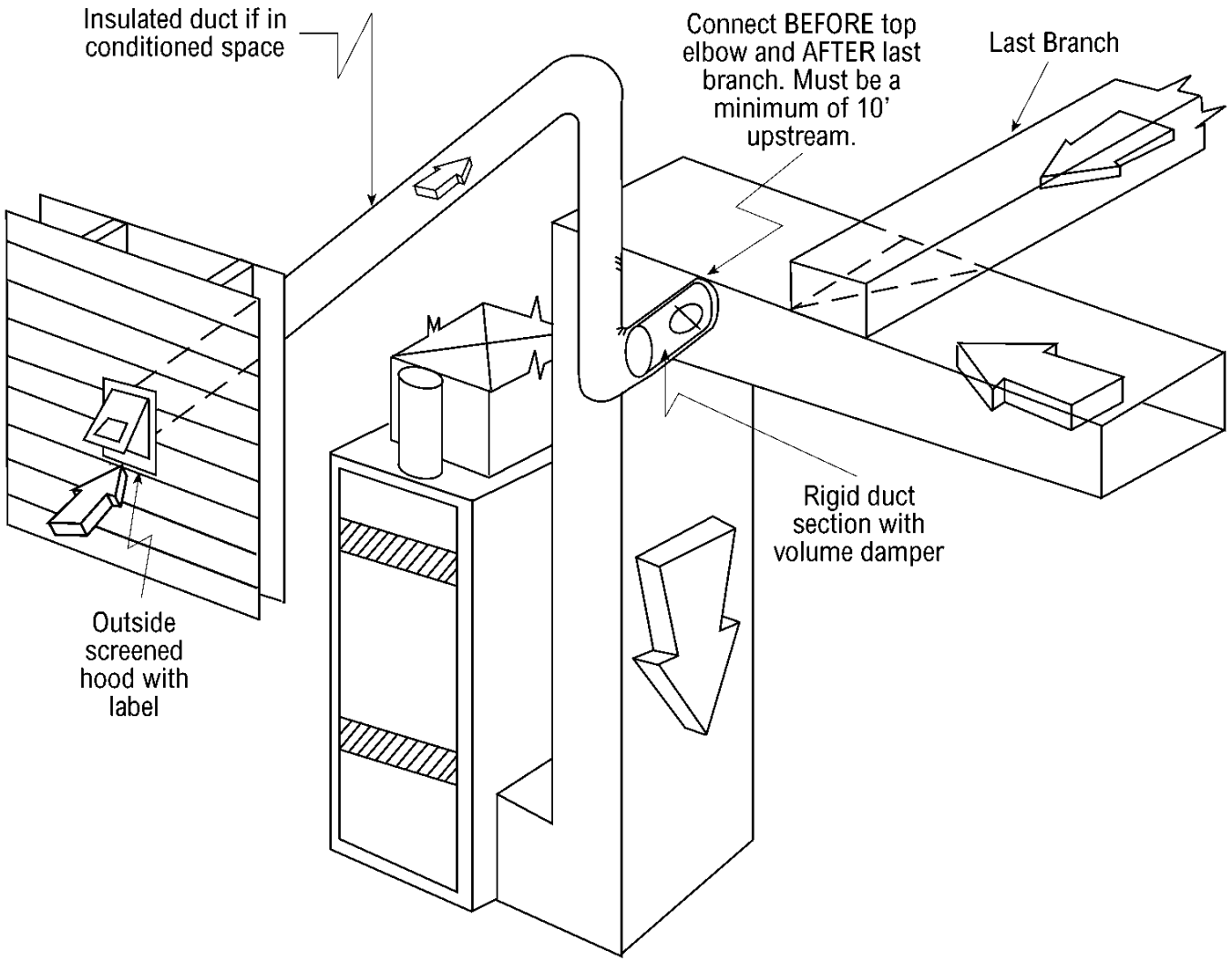
Supply Ventilation Options

- Integrated with Air Handler
- Inline Supply Fan
- Multiport Supply Fan
- Dehumidifying Supply Fan

Integrated with Air Handler

- Use air handler to pull in outdoor air
- Advantages:
  - distribution
  - filtration
- Disadvantages:
  - Fan energy
  - Cold air on furnace heat exchanger
  - Draft complaints

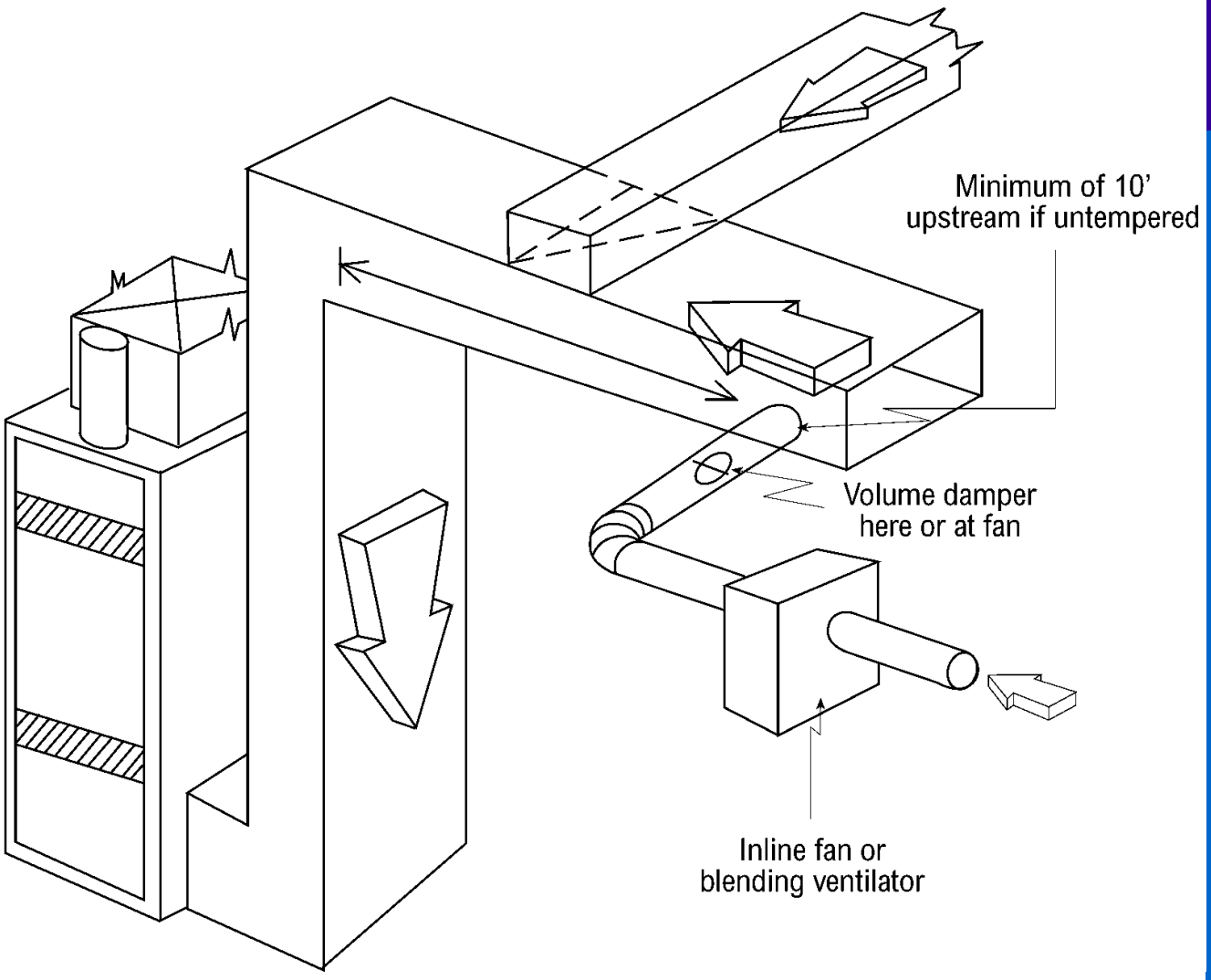
OUTDOOR AIR DUCT INTEGRATED WITH THE FURNACE



Inline Supply Fan

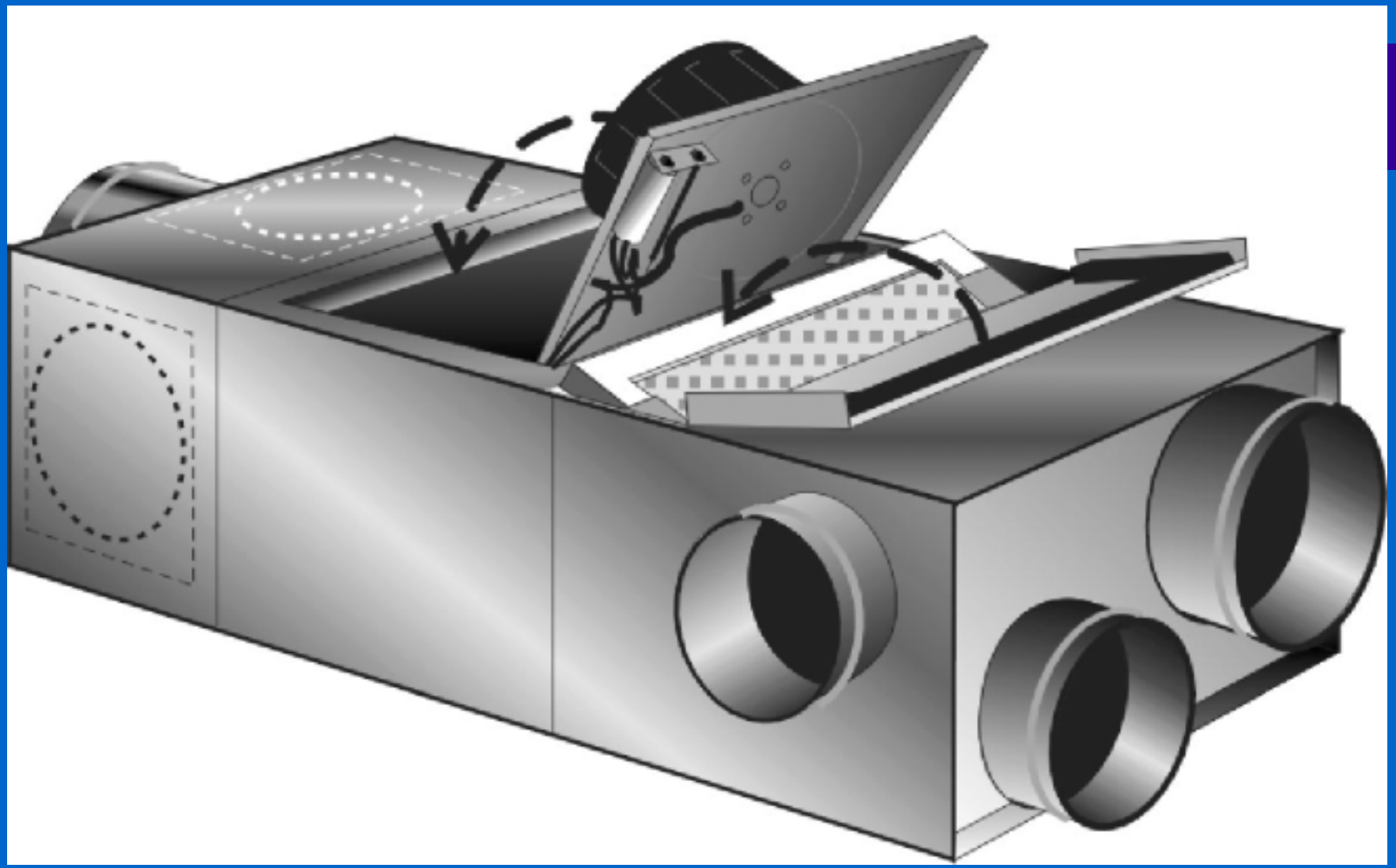
- May be integrated with the furnace for distribution
- May have dedicated supply duct(s)
- Advantages:
  - Quiet, low energy
- Disadvantages:
  - Extra fan
  - Must be accessible

POWERED MAKE-UP AIR CONNECTION



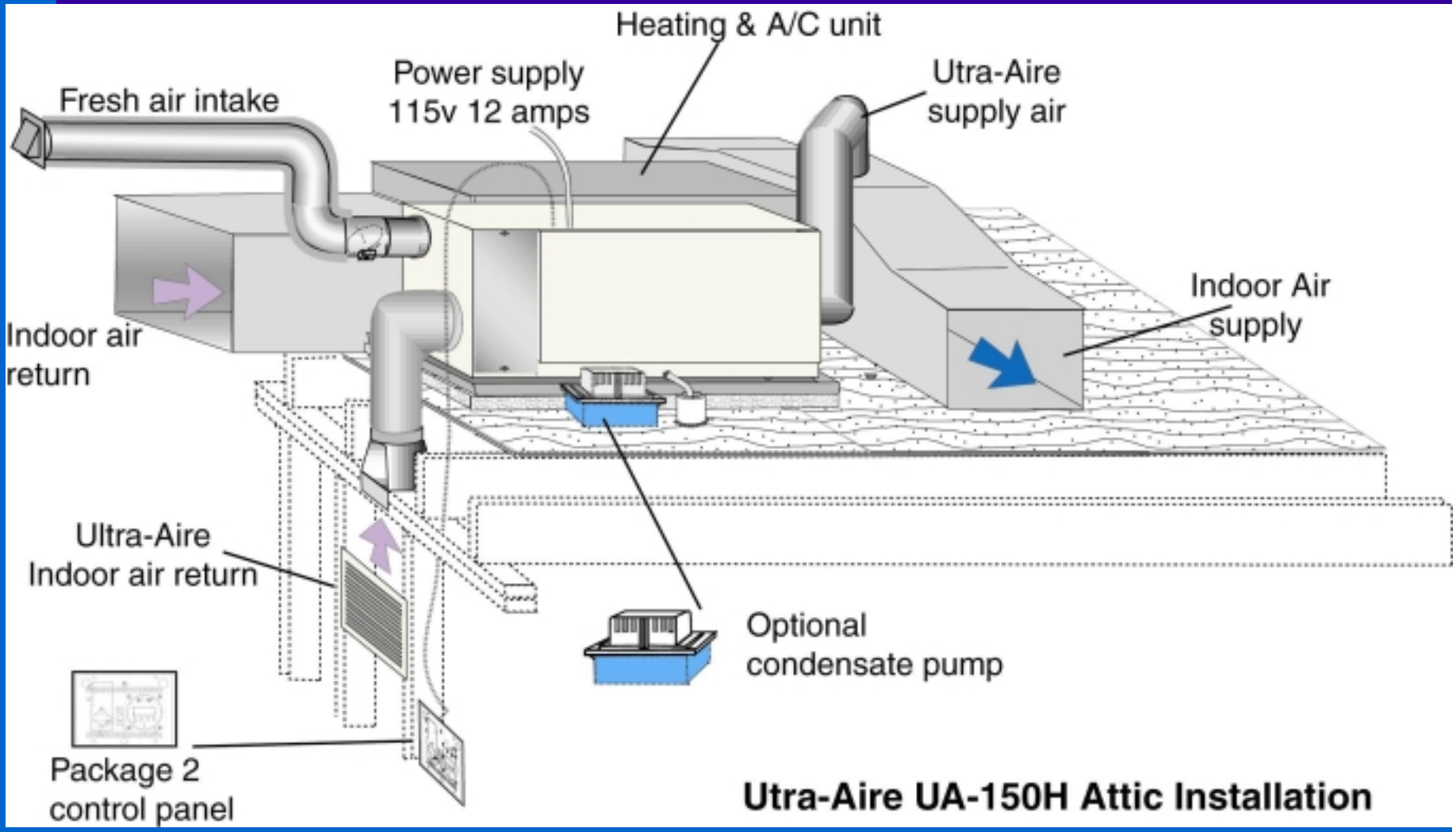
Multiport Supply Fan

- Delivers to several rooms
- Can blend and/or filter air for comfort
- Advantages:
  - Quiet, filtration, tempering, multiple grilles
  - Avoids air handler temperature shock issues
- Disadvantages:
  - More ducting
  - Must be accessible for service



Dehumidifying Supply Fan

- Single unit provides dehumidification, filtration, and ventilation air
- Advantages:
  - Multipurpose unit
  - Dehumidifies and filters both indoor and outdoor supply air
- Disadvantages:
  - First cost, ducting


Heating & A/C unit
Power supply
115v 12 amps
Fresh air intake
Utra-Aire
supply air
Indoor Air
supply
Indoor air
return
Ultra-Aire
Indoor air return
Optional
condensate pump
Package 2
control panel
Utra-Aire UA-150H Attic Installation

Exhaust Ventilation Options

- “Double Duty” Bath Fan
- Remote Inline Exhaust Fan
- Multiport Exhaust Fan

“Double Duty” Bath Fan

- Quiet bath fan that provides both spot ventilation and whole house IAQ ventilation
- 0.2-1.5 sone fan to increase operation and life
- Advantages:
  - Quiet, long life, no additional fan
- Disadvantages:
  - First cost

Remote Inline Exhaust Fan

- Inline fan in attic with one or two pickups
- Remote mounted so fan noise is not an issue
- Advantages:
  - Quiet operation if flex duct is used
  - Versatile installation; may replace two fans
- Disadvantages:
  - First cost, may be noisy if metal duct is used
  - Must be accessible for service

Multiport Exhaust Fan

- Box fan in attic with 3-8 pickups
- Remote mounted so fan noise is not an issue
- Advantages:
  - Quiet operation if flex duct is used
  - Versatile installation; may replace 3-8 fans
- Disadvantages:
  - First cost, may be noisy if metal duct is used
  - Must be accessible for service


ALDES
MPV 200/4
EXHAUST FAN

“Balanced” Ventilation Options

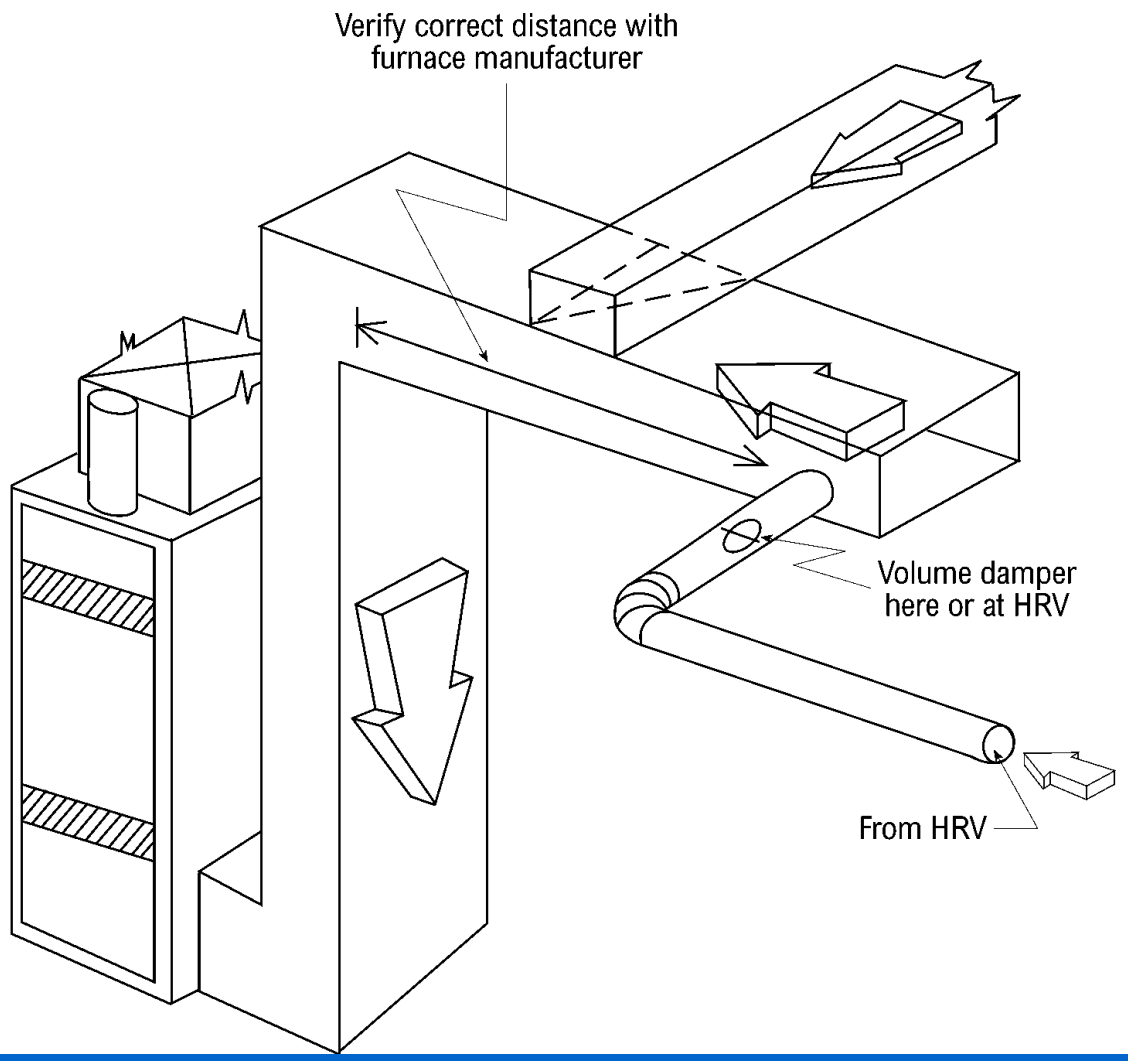
- Heat Recovery Ventilator
- Energy Recovery Ventilator
- Balanced Supply and Exhaust Fans
- Integrated Heating/Cooling/Ventilation

Heat Recovery Ventilator

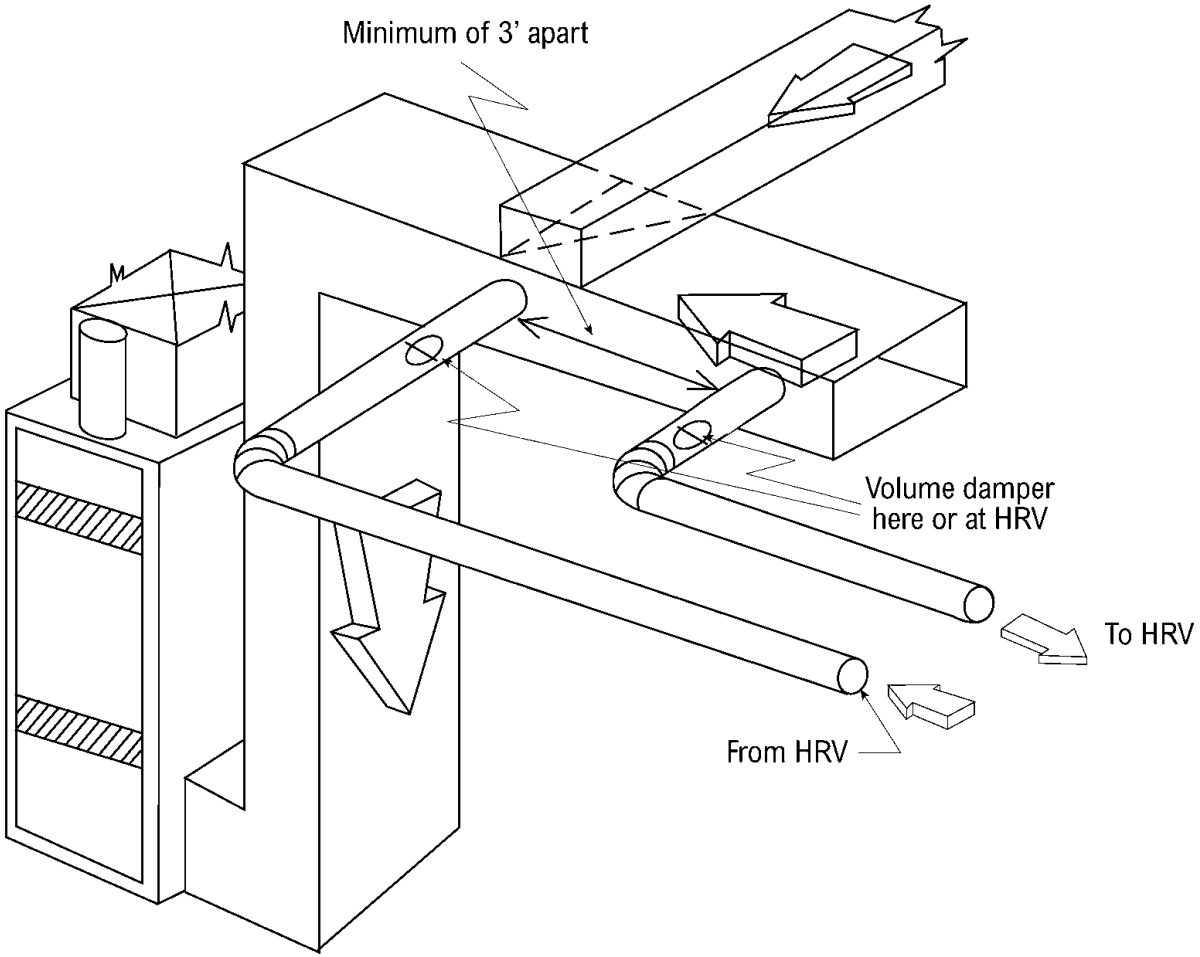
- Primarily used in cold climates
- Typically 60-70% efficient at heat recovery
- Advantages:
  - May reduce heating costs
  - Reduces drafts
- Disadvantages:
  - Highest first cost
  - “Cost effectiveness” is hard to calculate


UP
CORE CLEANING

DIRECT HRV CONNECTION WITH SUPPLY ONLY



DIRECT HRV CONNECTION WITH BOTH SUPPLY AND RETURN



Energy Recovery Ventilator

- Primarily used in cooling climates
- Typically 70-80% efficient at energy recovery
- Advantages:
  - May reduce cooling costs, reduces drafts
- Disadvantages:
  - Highest first cost
  - “Cost effectiveness” is hard to calculate

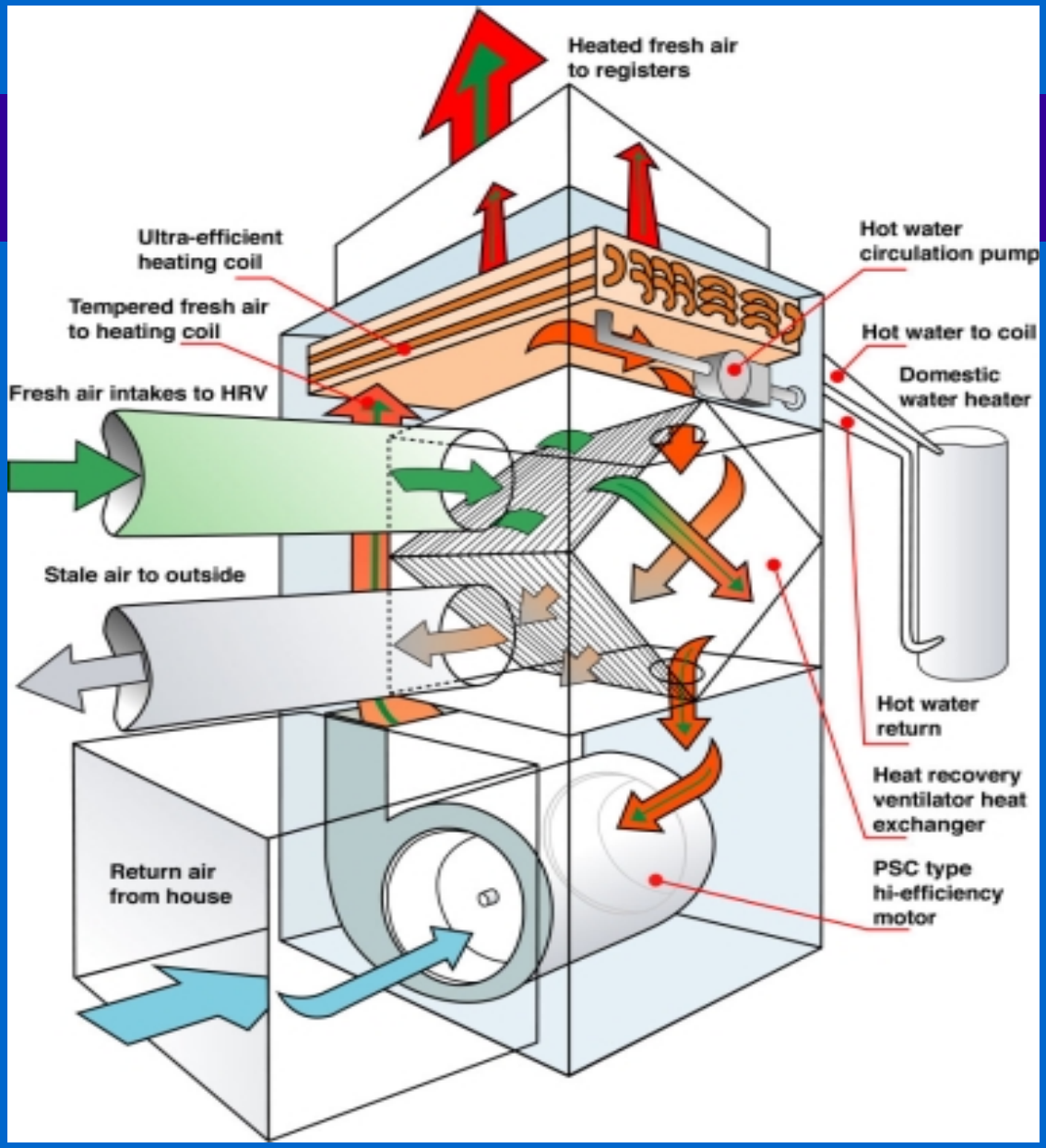

LIFEBREATH
HEAT RECOVERY VENTILATORS (HRVs)

Balanced Supply and Exhaust Fans

- Uses a quiet exhaust fan and a supply fan
- Fan flows nominally equal to maintain balanced flow
- No heat exchange core
- Advantages:
  - Lower cost way to get balanced flow
- Disadvantages:
  - Higher first cost for two fans

Integrated Heating/Cooling/Ventilation

- One unit provides all HVAC needs
- Canadian Advanced Integrated Mechanical System (AIMS) Project
- Advantages:
  - Single unit, simpler ducting
- Disadvantages:
  - First cost, lack of awareness and training


Heated fresh air
to registers
Ultra-efficient
heating coil
Tempered fresh air
to heating coil
Fresh air intakes to HRV
Stale air to outside
Return air
from house
Hot water
circulation pump
Hot water to coil
Domestic
water heater
Hot water
return
Heat recovery
ventilator heat
exchanger
PSC type
hi-efficiency
motor

Ventilation Equipment Selection

- Performance Testing and Certification
- Energy Star Ventilation Equipment
- Utility Promotion
- Codes and Standards

Performance Testing and Certification

- Home Ventilating Institute
  - Ventilation Industry Trade Association
  - 95%+ of North American products
  - Airflow and sound testing
  - Certification program
  - Certified Product Directory
  - www.hvi.org
  - 1-847-394-0150

Energy Star Ventilation Equipment

- Low energy and quiet fans
  - Range Hoods max 4.0 sones, 2.8 cfm/w
  - Bath fans <75 cfm max 2.0 sones, 1.4 cfm/w
  - Bath fans 75-200 cfm max 1.5 sones, 2.8 cfm/w
- Bath fans and IAQ exhaust fans this summer
- Supply fans, inline fans, multiport fans, ceiling fans, and air handlers in next year
- Website: www.energystar.gov

Utility Promotion

- Cash incentives for quiet, low energy fans
  - $50-125 incentives for 1.5 sone max fans with efficacy of 2 cfm/watt or better
- Program incentives/requirements
  - Seattle City Light Build Smart
    - 1.0 sone max fans with 35 watts max draw
  - Super Good Cents Manufactured Housing Program
    - 1.0 sone max fans delivering 50 or 70 cfm

Codes and Standards

- Washington State Ventilation and Indoor Air Quality Code (1991, updated 2000)
  - 1.5 sone max fans or integrated systems operating for a minimum of eight hours a day
    - 15 cfm/person plus .01 cfm/square foot; generally 50-125 cfm
  - 50 cfm intermittent/20 cfm continuous bath fan
  - 100 cfm intermittent/25 cfm continuous kitchen exhaust

Codes and Standards (cont)

- Minnesota Energy Code (1998)
  - 1.0 sone max fans or integrated systems operating whenever the house is occupied
    - 15 cfm/person for people ventilation, 0.05 cfm/square foot for total ventilation
  - 1.5 sone max for remote fans and HRVs
  - Stringent requirements to avoid backdrafting
  - Must have operable windows or mechanical ventilation in bathrooms and kitchens

Codes and Standards (cont)

- ASHRAE Standard 62.2 (June 2001 draft)
  - 1.0 sone max fans or integrated systems operating continuously in most climates
  - 1.5 sone max bath fans
  - 1.5 sone max range hoods at 100 cfm/low speed
- International Residential Code (IRC) and International Building Code (IBC) (2000)
  - 50 cfm intermittent/25 cfm continuous bath fan

Don Stevens

- Stevens and Associates
- PO Box 398
- Keyport, WA 98345
- 360-697-5414
- dstevens@telebyte.com